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Rhina japonica Gill = *Squatina japonica* Bleeker.

Another species also nearly allied to the *R. squatina* is found along the eastern coast of the United States.

Rhina dumérili Gill = *Squatina duméril* Les.

A sixth has been described as an inhabitant of the California seas.

Rhina californica Ayres = *Squatina californica* Ayres, olim.

The name of a species (*Squatina angelina* Gray,) inhabiting the Caribbean sea has been published in Gray's Catalogue of the Chondropterygians, but not the slightest diagnosis has been given.

RHINA CALIFORNICA Ayres.

Squatina californica Ayres, Proc. of the California Academy of Natural Sciences, part 2, p. 29, 1859.

Rhina californica Ayres, Proc. of the California Academy of Natural Sciences, part 2, p. 54, fig. 7, 1861.

On the limits and affinity of the Family of LEPTOSCOPOIDS.

BY THEODORE GILL.

In the Proceedings of the Academy of Natural Sciences for April, 1859, (vol. xi. p. 282,) there has been first made known a peculiar type (*Dactyloscopus tridigitatus*) of fishes having the general appearance of a Uranoscopoid, but distinguished by the structure of the ventral fins, each of which had three simply articulated rays like those of the Blennioids. "Notwithstanding the abnormal and blennioid structure of the ventrals," the new type was said to agree in all other characters, except dentition and the origin of the dorsal fin, with a species referred to the genus *Uranoscopus** by Sir John Richardson; it was consequently referred next to that fish, but as the type of a distinct subfamily, (Dactyloscopinæ,) the species of Richardson being also considered as the type of another peculiar subfamily, (Leptoscopinæ.)

In the "Annals and Magazine of Natural History," for February, 1860, (vol. iii. p. 86,) Günther described a type which differed from *Leptoscopus* and agreed with *Dactyloscopus* in the want of palatal teeth.

In a subsequent "Synopsis of the Uranoscopoids," published in the Proceedings of the Academy for May, 1861, (vol. xiii. p. 108,) the correctness of the approximation of the Dactyloscopinæ next to Leptoscopinæ was still further insisted upon, and both were retained in the same family with the Uranoscopinæ.

In the third volume of the "Catalogue of the Acanthopterygian Fishes in the Collection of the British Museum," *Dactyloscopus* was referred to the Blennioids, and interposed between *Tripterygium* and *Dictyosoma*. Dr. Günther remarked, that "*Dactyloscopus* has been referred by Gill to the *Uranoscopina*,† from which, however, it differs in several cardinal characters. The structure of the dorsal and ventral fins is that of a Blennioid. The absence of *pseudo-branchiæ* is very peculiar; but in this respect it differs equally from the *Uranoscopina* and Blenniidæ."‡§

The Uranoscopinæ formed a "group" or subfamily of the family of Trachinidæ as understood by Günther.

* *Leptoscopus macropygus*.

† The group Uranoscopina of Günther, which is equivalent to the family of Uranoscopoids, after the elimination of the species with less than five ventral rays, is meant, and not the subfamily of Uranoscopinæ as restricted by Gill.

‡ Günther, op. cit., iii. p. 279.

§ In his remarks on the family Blenniidæ, Dr. Günther has observed that the value of the development of the pseudo-branchiæ, as a character of that family, "appears not to be sufficient, *Dactyloscopus* and *Putecus* forming exceptions, although the structure of their dorsal fin proves that their natural place is with or near the Blennioids." The real structure of the dorsal of *Dactyloscopus* proves the contrary; the natural place of *Putecus* is rather near, than with, the Blennioids. (*Genypterus* is a Chilian Ophidioid; *Loarces* and *Lycodes* form a peculiar family, all wanting true dorsal spines.)

The characters of the Trachinidæ and Blenniidæ given by Günther are essentially interchangeable, with the exception of the following :

TRACHINIDÆ.—“One or two dorsal fins, *the spinous portion being always much less developed and shorter than the soft* ; the anal similarly developed as the soft dorsal ; ventrals with one spine and five rays.* Gill openings more or less wide.”†

BLENNIIDÆ.—“One, two, or three dorsal fins, occupying nearly the whole of the back,—the spinous portion, if distinct, being as much developed as the soft, or more.” “Ventrals jugular, composed of a few rays, and sometimes rudimentary or entirely absent.”

Only two “cardinal characters” have thus been used to distinguish the Trachinidæ and Blenniidæ.

Dactyloscopus was said by Günther to have “one dorsal, formed by spines only ;” it therefore had nominally the distinctive characters of the Blennioids as understood by that gentleman.

I have, on the other hand, specifically asserted that only the first eleven or twelve rays are spines, the others (22—31) being “articulated, and divided on each side of the mesial line to the base, but so connected as to appear like simply articulated rays, especially from a lateral view.” Günther's observation is therefore incorrect.‡

Dactyloscopus then agrees with the Trachinoids and differs from the Blennioids in a character which has been emphatically insisted upon by Dr. Günther, and to which the structure of the ventrals has been always subordinated by him.

It disagrees with the Trachinoids and agrees with the Blennioids in the structure of the ventral fins ; a character which Günther has elsewhere regarded as of little importance.

It therefore, according to Günther's diagnosis, only differs from the Trachinoids in one “cardinal character,” which is of much less value than the cardinal character which it shares in common with the Blennioids.

Further, it agrees with the Trachinoids and departs from the Blennioids by the width of the gill openings, and also differs from the Blennioids by the large scales.

Accepting Dr. Günther's own views of the relative value of certain characters, *Dactyloscopus* is thus more allied to the Trachinoids than to the Blennioids. Therefore, it was probably only on account of a misapprehension that the genus was referred to the Blennioids. I shall, however, still refer to the arguments adduceable in favor of its reference near the Uranoscopoids.

The form of the head of a Blennioid is quite characteristic, owing to the abrupt decurvature of the profile in front of the eyes, and the almost or quite horizontal cleft of the mouth.

Equally characteristic is the form in the Uranoscopoids, the profile in front of the eyes being continued on nearly the same plane as the crown, while the cleft of the mouth is very oblique or vertical.

Dactyloscopus agrees in general form with the Uranoscopoids.

The Uranoscopinæ, § Leptoscopinæ and Dactyloscopinæ agree with each and differ from the Blennioids in—

1st. General form.

* In *Epicopus* with one spine and six rays.—Günther.

† The italicized parts are repeated from Günther's Work.

‡ I am happy to state, that Dr. Günther has since admitted that the anterior rays of *Dactyloscopus* alone are spinous. In a letter of the 25th May, he writes : “Your statement of a portion of the dorsal rays being articulated is correct ; they are very well preserved in the smallest of our specimens, (18 lines long,) whilst in the larger (30 lines) most of them are broken at the top, as I now see.” Dr. Günther has not given his present opinion of the affinity of the *Dactyloscopi*.

§ It is proper here to remark, that the *Uranoscopus adhaesipinnis* of Blyth (Journal of the Asiatic Society of Bengal, vol. xxix. (1860,) p. 42.) does not belong to the same family as *Uranoscopus*, but apparently belongs to the same genus as the *Polycaulus elongatus* (Günther ex Cuv.)

- 2d. Form of the head.
- 3d. Direction of the mouth.
- 4th. Extent of the branchial aperture.
- 5th. Development of a fold between the limbs of the lower jaw.
- 6th. Fringed lips.
- 7th. Brevity of the spinous portion of the dorsal fin.

The *Leptoscopinæ* and *Dactyloscopinæ* still further agree with each, still differing from the *Blennioids* in—

- 1st. Special form.
- 2d. Course of lateral line.
- 3d. Special form of head.
- 4th. Fringed opercula.

It agrees with the *Blennioids*, and departs from the *Uranoscopoids* in—

- 1st. The structure of the ventrals.
- 2d. Simplicity of the pectoral rays.

With the knowledge that the attributes of the *Uranoscopoids* above referred to are very peculiar and characteristic, it must be evident that such a combination is entitled to much more consideration than the simple agreement in two features, which are by no means peculiar to one group, but shared by many dissimilar families and regarded as of slight importance by Günther himself.

In the "Synopsis of the *Uranoscopoids*," I have remarked that, on account of the special similarity of form, the larger scales, median lateral line, smooth head, extent of the dorsal and anal fins, and the absence of pyloric cæca, "the *Leptoscopinæ* and *Dactyloscopinæ*" together would "be probably referred by some future naturalist to a distinct family." But owing to the many characters shared in common, I doubted the propriety of such a separation. Since the discovery of two other forms, I am now convinced that such a family exists in nature, and therefore now establish it under the name of *LEPTOSCOPOIDÆ*.

Family *LEPTOSCOPOIDÆ* Gill.

Body equally developed above and below the axis, regularly and slowly decreasing in height to the caudal fin, and behind the abdominal region much compressed.

Scales cycloid, moderate in size, and regularly imbricated.

Lateral line anteriorly running along each side of the back and thence decurved and continued along the middle to the base of the caudal fin.

Head oblong, above nearly plane or slightly convex transversely and not crested, scarcely curved towards the snout. Eyes rather small, more or less directed upwards or on the upper surface of the head, and advanced far forwards. Suborbital chain enlarged, but no bone connected with the preoperculum as a "stay." Nostrils double. Opercular bones normally developed with regard to each other. Operculum fringed.

Mouth with the cleft very oblique or subvertical. Intermaxillary bones with moderate or rather short posterior branches, and with the diverging forming the upper portion of the oral arch, the supramaxillars forming the sides. Lips fringed.

Branchial apertures very large and below in front of the scapular arch, partly covered below by a transverse duplicature or fold of the membrane between the limbs of the lower jaw.

Branchiostegal rays, six.

Pseudobranchiæ, present or absent.

Dorsal fin entire and very long, with its anterior rays spinous, and the posterior articulated.

Anal fin very long, commencing behind the anus, which is itself in or close behind the breast.

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Caudal fin completely homocercal or equally developed above and below the axial line.

Pectoral fins variable, with the base concave and descending forwards below.

Ventral fins jugular, normally developed (I. 5) or with only three articulated rays, and a rudimentary spine in each.

The vertebræ are present in increased number ($\frac{10 + x}{14 + y}$).

The stomach is siphonal, and the pyloric cæca are obsolete.

This family is closely related to that of the Uranoscopoids, but appears to be sufficiently distinguished on account of its elongated form, the course of the lateral line, the development of the dorsal and anal fins, and the absence of pyloric cæca. Other characters of less importance, but possessed by all the representatives of the Leptoscopoids, and by none of the Uranoscopoids, are the entire nudity or smoothness of the head, the fringes of the opercula, and the larger size of the scales.

Its affinities with other families are remote; the one most nearly allied to it after the Uranoscopoids is that of the Trachinoids. Its relations to the Blennioids are no more intimate than with a number of others.

The representative of the family of Leptoscopoids may be distributed among three minor groups or subfamilies, as follows:

- I. Pectoral rays branched. Ventral fins perfect, (I. 5). (Dorsal fin remote from nape. Pseudobranchiæ developed), LEPTOSCOPINÆ.
 - α. Vomerine and palatine teeth developed..... Leptoscopus.
 - β. Vomerine and palatine teeth obsolete..... Craptalus.
- II. Pectoral rays simply articulated. Ventral fins imperfect, each with three simply articulated rays, (I. 3).
 - A. Dorsal fin commencing quite far behind the nape.
 - Pseudobranchiæ developed..... MYXODAGNINÆ.
 - β. Head conoid. Lower jaw obtusely pointed and with a short flap in front..... Myxodagnus.
 - α. Head cuboid. Lower jaw transversely rounded in front..... Dactylagnus.
 - B. Dorsal fin commencing at the nape. Pseudobranchiæ obsolete..... DACTYLOSCOPINÆ.
 - Head cuboid..... Dactyloscopus.

In deference to the opinions of some naturalists, I had at one time almost resolved to refer the tridigitate Leptoscopoids to a peculiar family which would be characterized by the simply articulated rays of the pectoral fins and the imperfect blennioid condition of the ventral fins. On reconsideration, however, I am yet unable to convince myself of the propriety of such an act, and think that it will be advisable to at least defer it until the value of family characters among fishes may be better known.

LEPTOSCOPINÆ Gill.

Leptoscopinæ *Gill*, Proc. Acad. Nat. Sci. Phila. vol. xi. (1859), p. 133; vol. xiii. (1861) p. 116.

LEPTOSCOPUS Gill.

Leptoscopus *Gill*, loc. cit.

LEPTOSCOPUS MACROPYGUS Gill.

Uranoscopus macropygus *Rich*.

CRAPTALUS Günther.

Craptalus *Günther*, Annals and Mag. Nat. Hist. ser. iii. vol. vii. p. 86, (1861.)

[Oct.

CRAFTALUS NOVÆ-ZELANDIÆ Günther.

MYXODAGNINÆ Gill.

Myxodagninæ Gill, Proc. Acad. Nat. Sc. Phila. vol. xiii. (1861), p. 263.

DACTYLAGNUS Gill.

DACTYLAGNUS MUNDUS Gill.

MYXODAGNUS Gill.

Myxodagnus Gill, op. cit. and Günther.

MYXODAGNUS OPERCULARIS Gill,

DACTYLOSCOPINÆ Gill.

Dactyloscopinæ Gill, Proc. Acad. Nat. Sci. Phila. vol. xi. (1859), p. 133 ;
vol. xiii. (1861), p. 116.

DACTYLOSCOPUS Gill.

Dactyloscopus Gill. op. cit.

The three species of this genus may be distinguished as follows :

I. Scales of median portion of lateral line 31—32.

Height scarcely equal to one-seventh of length. Scales

of dorsal portion of lateral line 11 (12)..... *D. tridigitatus*.

Height nearly equal to a sixth of length. Scales of

dorsal portion of lateral line 13. (conf. color)..... *D. poeyi*.

II. Scales of median portion of lateral line 24..... *D. pectoralis*.

DACTYLOSCOPUS TRIDIGITATUS Gill.

Dactyloscopus tridigitatus Gill, Günther.

D. X-XI. 27. A. II. 28-33. C. 13. P. 13. Scales 11 (12) | 4 | 31. *Günther* in litt.

D. XI-XII. 26-28. A. II. 30-32. C. 12. P. 13. Scales 11 | 4 | 30-31. *Gill*.

DACTYLOSCOPUS POEYI Gill.

D. XI. 31. A. II. 32. C. 12. P. 13. Scales 13 | 4 | 31.

DACTYLOSCOPUS PECTORALIS Gill.

D. XII. 22. A. II. 26. C. 12. P. 12. Scales 13 | 3 | 24.

Genus DACTYLAGNUS Gill.

Body moderately elongated, its greatest height equalling a sixth or seventh of the length.

Scales moderately large and uniform.

Head cuboid, oblong, scarcely convex transversely above. Eyes small, directed obliquely upwards, and situated near the snout on the upper surface of the head. Interorbital area moderate and channelled.

Mouth very oblique or subvertical, the snout truncated in front. Lower jaw transversely convex in front and with no barbel.

Teeth acute, in a narrow band along each jaw. Palate smooth.

Dorsal fin perfectly entire, commencing rather farther behind than the anal, and with its anterior portion armed with about ten slender spines.

Anal fin longer than the dorsal.

This genus so closely resembles *Dactyloscopus* externally that I had provisionally referred its typical and only species to that group, without a suspicion that it might belong to a different one, and it was only after my attention was particularly attracted to it that I ascertained how distinct it really was. It may be briefly described as a *Myxodagnine* in the mask of a *Dactyloscopus*. It differs from the latter genus chiefly in the structure of the dorsal 1862.]

fin and the presence of pseudobranchiæ, of which no trace is perceptible in *Dactyloscopus**

DACTYLAGNUS MUNDUS Gill.

The greatest height is rather less than a sixth ($\cdot 16$) of the total length. The head, from the prominent chin to the posterior margin of the suboperculum, forms a fifth of the same length, while the caudal forms a tenth. The dorsal fin commences nearly over the second inarticulated ray of the anal fin, and its spines increase in a slightly curved line towards the articulated rays. The oblique levator muscle of each pectoral ray is remarkably developed externally, and impart to the rays a curve upwards towards the ends.

The lateral line runs near the back through fourteen scales, is deflected on four, and thence continued along the middle through thirty-six.

D. X. 31. A. II. 38. C. 11, 1, 4, 4, 1, IV. P. 15. V. I. 3.

Scales 14 | 4 | 36 —
5

Extreme length $5\frac{1}{2}$ inches.

Body—Greatest height 16. Least height 16. Least height of tail 4. Greatest width 12.

Head—Greatest length 20. Distance from upper jaw to nape 10. Height at preoperculum 12. Greatest width 12. Width behind eyes $8\frac{1}{2}$. Height behind eyes 10. Width of interorbital area 2.

Eye—Diameter 3. Distance from snout 3.

Dorsal (spinous).—Distance from snout 23. Height at first spine $3\frac{1}{2}$. Height at second spine $4\frac{1}{2}$. Height at tenth spine $5\frac{1}{2}$. Height at first ray $5\frac{1}{2}$.

Anal—Distance from snout 27.

Caudal—Length of middle rays 10.

Pectoral—Length 18.

Ventral—Length of inner ray 10.

A single specimen of this species was obtained at Cape St. Lucas by Mr. Xantus, and is contained in the collection of the Smithsonian Institution. The species is decidedly the giant among the known species of the tridigitate Lep-toscopoids, its length being nearly twice as great as the largest specimen of *Dactyloscopus tridigitatus* known to me.

November 4th.

Mr. LEA, President, in the Chair.

Sixteen members present.

The following papers were presented for publication :

“Note on the species of *Brachinus* inhabiting the United States” and “Synopsis of the species of *Colymbetes* inhabiting North America, etc. By John L. Le Conte, M. D.”

“On the Pedipalpes of North America. By Horatio C. Wood.”

November 11th.

Mr. VAUX, Vice-President, in the Chair.

Seventeen members present.

* Dr. Güther has kindly informed me that he was unable to find pseudobranchiæ in the *Dactyloscopus tridigitatus*, but that there is “a slight swelling at their usual place,” which is ascertained to be “muscular substance, as seen under the microscope.”

[Nov.